

New Records of *Agapetes* D. Don ex G. Don (*Ericaceae*) Species from India

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Six species of *Agapetes* D. Don ex G. Don (*Ericaceae*) viz., *A. hillii* Brandis, *A. kingdonis* Airy Shaw, *A. leucocarpa* S. H. Huang, *A. megacarpa* W. W. Sm., *A. subsessilifolia* S. H. Huang & al. and *A. subvinacea* Airy Shaw are recorded for the first time from India. All are described in detail with illustrations and notes for easy recognition.

Key words: *Agapetes*, *Ericaceae*, India, new records.

The genus *Agapetes* D. Don ex G. Don (*Ericaceae*) with ca. 95 species are distributed throughout Asia to the West Pacific (Mabberley 1997); with ca. 34 species in India (Santapau and Henry 1973). In India they are restricted to E Himalayas and NE India. Extensive field surveys were undertaken in E Himalayas and NE India along with the study of specimens in several Indian herbaria during 2000–2004 and it is clarified that ca. 58 species and 15 varieties are distributed in India. After a critical study of all the specimens, the following six species are recorded for the first time from India. All are described and illustrated below:

1. ***Agapetes hillii*** Brandis, Ind. Trees: 404 (1906); Airy Shaw in Kew Bull. **13**: 472 (1959); W. J. Kress & al. in Contr. U. S. Natl. Herb. **45**: 213 (2003). **Type:** MYANMAR; ‘Burma’, Hills East of Bhamo, 1350 m, Oct. 1901, M. Hill 112 (K, photo !).
[Fig. 1]

Epiphytic shrub on tall trees. Stems robust, terete. Lignotubers swollen. Leaves pseudowhorled, pseudowhorls 2–12 cm apart, 4–6-leaved; lamina sessile, narrowly elliptic, 10–15 × 2.2–3.5 cm, obtuse to cordate at base, obscurely serrate at margin (serratura 12–15 pairs), obtusely acuminate at apex, coriaceous, glabrous, veins raised on both surfaces, brochidodromous, secondary veins 16–18 pairs, alternate to opposite at 85°–90°, marginal vein obscure, 1–2 mm away from margin. Inflorescences pseudo-terminal or axillary, corymbose, 6–9-flowered, sparsely puberulous; peduncle 1.0–1.5 cm long, puberulous, peduncular bracts 3–6, closely alternate. Flowers red; pedicels slightly obconical, 2.0–3.6 cm long, 2.0–3.5 mm broad at apex, puberulous; pedicelar bract 1, deltoid-linear, puberulous outside; bracteoles 2, ovate, 1.0–1.5 × 0.5–0.7 mm, opposite, serrate at margin, puberulous outside. Calyx 8–10 mm long, 3.5–4.5 mm in diameter, puberulous; lobes linear-elliptic,

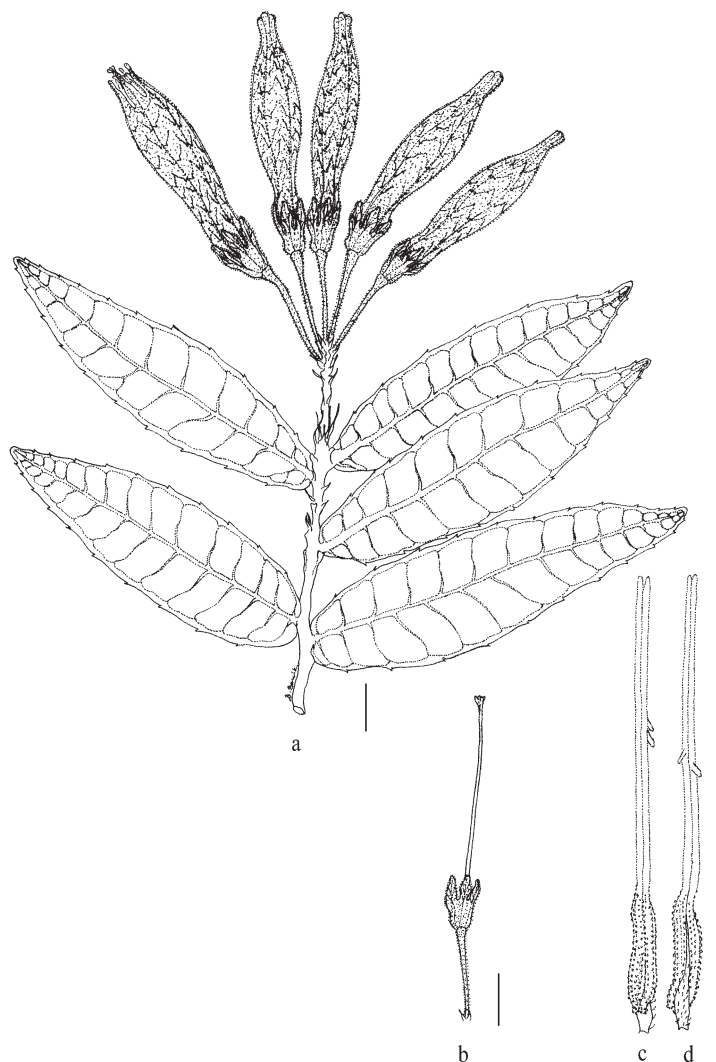


Fig. 1. *Agapetes hillii* Brandis. a. Habit. b. Calyx and style. c, d. Stamens. Scale bars: a, b = 1 cm; c, d = 5 mm (voucher: Anupam & Muthuu 2366, APFH).

6.0–7.5 × 1.6–3.5 mm, entire, obtusely caudate at apex, puberulous outside, secondary veins 2–3 pairs at 10°–15°, branched near margin. Corolla red, tubular-urceolate, 4.5–5.0 cm long, ca. 0.8 cm in diameter, sparsely puberulous outside, 8–10 secondary veins at 15°–60°, directed upward, sometimes branched; lobes linear-deltoid, 7–11 × 2.5–4.0 mm, acute to obtuse at apex. Stamens 2-whorled, 37–52 mm long; larger 5 in outer

whorl; filaments spathulate, 2.5–3.0 × 0.7–0.9 mm, incurved, puberulous outside; anthers 35–39 mm long in total, thecae granular, 7.5–8.0 mm long, obscurely appendiculate at base, tubules 29–31 mm long, calcarate, spurs apical to tubule, 1.0–1.5 mm long, glandular at apex, reflexed. Style slender, 4.0–5.5 cm long; stigma 5-lobed; ca. 2.5 × 2.5 mm. Fruits not seen.

Distribution: India (Arunachal Pradesh:

Changlang District) and Myanmar.

Flowering: October to March.

Habitat: Common in subtropical forests from 1200–1350 m altitude.

Specimens examined: Arunachal Pradesh; Changlang District, Deban 22nd Mile, Namdapha, 14 March 2003, Anupam & Muthu 2366, fl. (APFH). The second collection of this species after more than 100 years.

2. ***Agapetes kingdonis*** Airy Shaw in Kew Bull. **13**: 489 (1959); W. J. Kress & al. in Contr. U. S. Natl. Herb. **45**: 213 (2003). **Type**: MYANMAR; 'Burma', Nam Tamai valley, 27°45'N, 97°45'E, 1800–2400 m, 16 Nov. 1937, Kingdon Ward 13462 (BM, photo!). [Fig. 2]

Epiphytic shrub, 10–15 cm high. Stems slender, terete, glabrous, up to 2 mm in diameter. Leaves compactly spiral, 5–10 mm apart; petiole ca. 1 mm long; lamina obovate or narrowly oblanceolate, 1.1–2.2 × 0.6–1.1 cm, cuneate to attenuate at base, serrate, slightly recurved at margin, apiculate at apex, coriaceous, veins obscurely raised above, brochidodromous, secondary veins 3–4 pairs at 15°–45°. Flowers solitary or up to 3-together on 2.0–2.5 mm long peduncle, sparsely puberulous; pedicels 8–12 mm long, sparsely puberulous and glandular-setose near apex, bracteate; bract and bracteoles obscure. Calyx winged, 10–11 mm long, 8–10 mm in diameter, glabrous; lobes lanceolate, ca. 7.0 × 2.5 mm, acute to acuminate at apex, membranous, glabrous, secondary veins 3–4 pairs, obscurely reticulate. Corolla tubular, 1.2–1.3 cm long, 3–5 mm in diameter, angular, glabrous, pointed in bud; lobes ovate, ca. 2.5 mm long, acute at apex. Stamens 11–12 mm long; filaments ca. 1.5 mm long; anthers 10–11 mm long in total, thecae granular, ca. 3 mm long, obscurely appendiculate at base, tubules 7–8 mm long. Style 12–13 mm long, glabrous. Berries subglobose, 14–16 × 6–8 mm, winged. Seeds obovoid, 0.2–0.8 × 0.2–0.3 mm, pointed at base.



Fig. 2. *Agapetes kingdonis* Airy Shaw. a, b. Habit with young fruits. Scale bars: a, b = 1 cm (voucher: M. K. Pathak 4315, CAL).

Distribution: India (Arunachal Pradesh: Dibang Valley District) and Myanmar.

Flowering and fruiting: November.

Specimens examined: Arunachal Pradesh: Dibang Valley district, Andra La Pass Expedition, July–Aug. 2002, fr., M. K. Pathak 4315 (CAL).

3. ***Agapetes leucocarpa*** S. H. Huang in Acta Phytotax. Sin. **25**: 317 (1987); F. Ruizheng & P. F. Stevens, Fl. China **14**: 512 (2005). **Type**: CHINA; Xizang, Medog, Bomi ad Nage, 23 June 1983, B. S. Li &

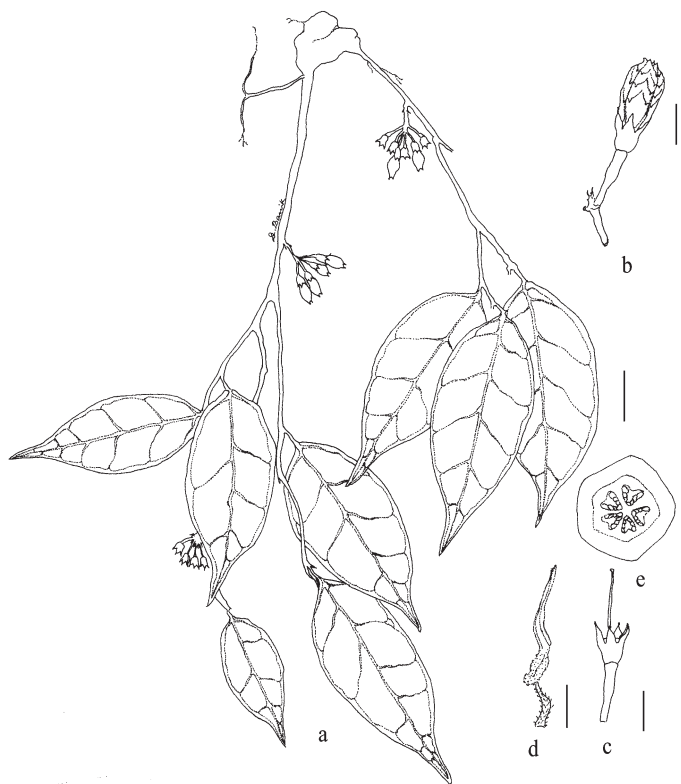


Fig. 3. *Agapetes leucocarpa* S. H. Huang. a. Habit with lignotuber. b. Flower. c. Calyx and style. d. Stamen. e. Transverse section of ovary. Scale bars: a = 1 cm; b, c = 3 mm; d, e = 1 mm (voucher: D. Banik 27410, CAL).

S. Z. Cheng 05116, fr. (PE–n.v.; illustration !). [Fig. 3]

Epiphytic drooping shrub, 0.5–2.0 m long. Lignotubers basal, amorphous, 1.0–1.5 × 1.0–1.2 cm. Stems slender, terete, glabrous, 1.5–2.0 mm in diameter. Leaves loosely spiral, 1.0–3.5 cm apart; petioles 0.3–0.5 cm long, glabrous, purple; lamina elliptic, 3–7 × 1.5–2.5 cm, broadly cuneate or rounded at base, entire at margin, acuminate or acutely acuminate (acumen 0.7–1.0 cm long) at apex, coriaceous, glabrous, brochidodromous, midvein sparsely raised above, secondary veins 5–6 pairs at 30°–60°, slightly depressed above, marginal vein 1–2 mm away from margin. Inflorescences purple,

corymbose, 4–9-flowered, glabrous, dealbatus; peduncles purple, 5–10 mm long, glabrous, dealbatus. Flowers purple; pedicels purple, ca. 5 mm long, slightly obconical, glabrous, dealbatus. Calyx purple, 3.5–4.0 mm long, 2.5–3.0 mm in diameter, glabrous, coriaceous, sparsely glandular, dealbatus; lobes ovate-triangular, ca. 1.5 × 1.5 mm, acuminate at apex. Corolla purple, urceolate, ca. 7 mm long, ca. 4 mm in diameter, glabrous, dealbatus, reticulate with 3–4 pairs of violet secondary veins at 30°–60°; lobes violet, triangular, ca. 0.5 × 0.7 mm, acute at apex. Stamens 4.5–5.0 mm long; filaments spatulate, ca. 1.5 mm long, sparsely puberulous, light mauve; anthers ca. 3.5 mm

long in total, thecae orange yellow, sparsely verrucate, ca. 1.2 mm long, obscurely appendiculate at base, tubules ca. 2 mm long, light yellow. Ovary ca. 3 mm in diameter; style ca. 6.5 mm long, slender; stigma truncate-glandular. Berries white but purple when young, globose, 4–5 mm in diameter. Fruiting pedicels stout, 7–8 × 1–2 mm, ca. 2.5 mm broad at apex. Seeds obovoid, obscure.

Distribution: India (Arunachal Pradesh: Dibang Valley District) and China (Xizang).

Flowering: November.

Fruiting: June. Lower Dibang valley population shows 4–9-flowered inflorescence and purple young fruits not reported earlier. This species is collected for the first time in flower.

Habitat: Common in subtropical forests from 1700–2750 m altitude, as an epiphyte on tall trees or on mossy bed of rocks.

Specimens examined: Arunachal Pradesh: Lower Dibang Valley District, Myudia Inspection Bungalow to Tiwari gaon, 2300 m, 2 Nov. 2002, D. Banik 27410, fl. (CAL); Myudia Inspection Bungalow to Myudia Pass, 2600 m, 2 Nov. 2002, D. Banik 27411, fl. (CAL); Myudia pass to surrounding hill area, 2750 m, 4 Nov. 2002, D. Banik 27415, fl. (CAL).

4. **Agapetes megacarpa** W. W. Sm. in Notes Roy. Bot. Gard. Edin. **11**(51–55): 194 (1919); Airy Shaw in Kew Bull. **13**: 472 (1959); F. Ruizheng & P. F. Stevens in Fl. China **14**: 507 (2005). **Type**: CHINA; Yunnan, Shweli-Salwin divide, in open thickets, 25°06'N, 2100 m, April 1917, G. Forrest 13698 (E, web image !). [Fig. 4]

Agapetes burmanica W. E. Evans in Notes Roy. Bot. Gard. Edin. **15**: 199 (1927); Airy Shaw in Bull. Misc. Inform. **1935**: 27 (1935); Kew Bull. **1948**: 84 (1948) & **13**: 470 (1959); W. J. Kress & al. in Contr. U. S. Natl. Herb. **45**: 213 (2003); F. Ruizheng & P. F. Stevens, Fl. China **14**: 507 (2005). **syn. nov.** Type: Myanmar, North East Upper 'Burma', 'On forest-trees and edges of cliffs, hills around Htawgaw'. Lat. 26°10'N. Long.

98°25'E. alt. 7000 ft., Sept. 1924. G. Forrest 24981, fl. (K, cibachrome ! E, web image !).

Epiphytic shrub, 1.5–6.0 m tall. Stems robust, terete, striate, lenticellate, glabrous. Leaves pseudowhorled, pseudowhorls 2–3 cm apart, 5–7-leaved; lamina sessile, lanceolate to elliptic, 10–16(–24) × 2–4(–6) cm, auriculate to cordate at base, entire to distantly serrate at margin, acuminate to obtusely acuminate at apex, coriaceous, glaucous above, glabrous, brownish below, veins obscurely raised above, brochidodromous, secondary veins 8–12 pairs at 45°–60°. Inflorescences pseudoterminal or axillary, corymbose, glabrous, 2–9-flowered; peduncles 9–10 mm long, stout; peduncular bracts 5–6, closely alternate, linear, 1.0–1.5 cm long, prominently veined. Flowers red; pedicels stout, fleshy, 1.6–3.0 cm long, slightly obconical, cupulate, 3–6 mm broad at apex; pedicelar bract 1, bracteoles 2, alternate, 1–2 mm long, deltoid, boat-shaped, acuminate at apex, glabrous. Calyx 10–17 mm long, 3–4(–6) mm in diameter, glabrous; lobes ovate to lanceolate, 6.5–11.0 × 2.5–4.0 mm, slightly constricted at base, acute to acuminate at apex, glaucous, 2–3 pairs of secondary veins at 10°–15°, sometimes branched near margin. Corolla creamy yellow to red, broadly tubular-urceolate, 4.5–6.0 cm long, 7–16 mm in diameter, glabrous, reticulate with 6–8 pairs of secondary veins at 30°–80°; lobes deltoid, 8–10 × 4–6 mm, acuminate to caudate at apex, veins closely reticulate. Stamens 46–50(–54) mm long, 2-whorled; filaments 3–6 mm long, spatulate, incurved, glabrous inside, puberulous to pilose outside; anthers 44–48 mm long in total, thecae granular, 7–12 mm long, appendiculate 1–2 mm long and bilobed at base, tubules 3.4–3.5 cm long, calcarate, spurs apical to tubule, ca. 1 mm long, reflexed. Styles filiform, 4.8–6.0 cm long; stigma glandular-capitate, 5-lobed, ca. 2.0 × 1.5 mm. Berries red, globose, 1.0–1.2 × 1.1–1.2 cm, glabrous. Seeds obovoid, 1.5–2.0 ×

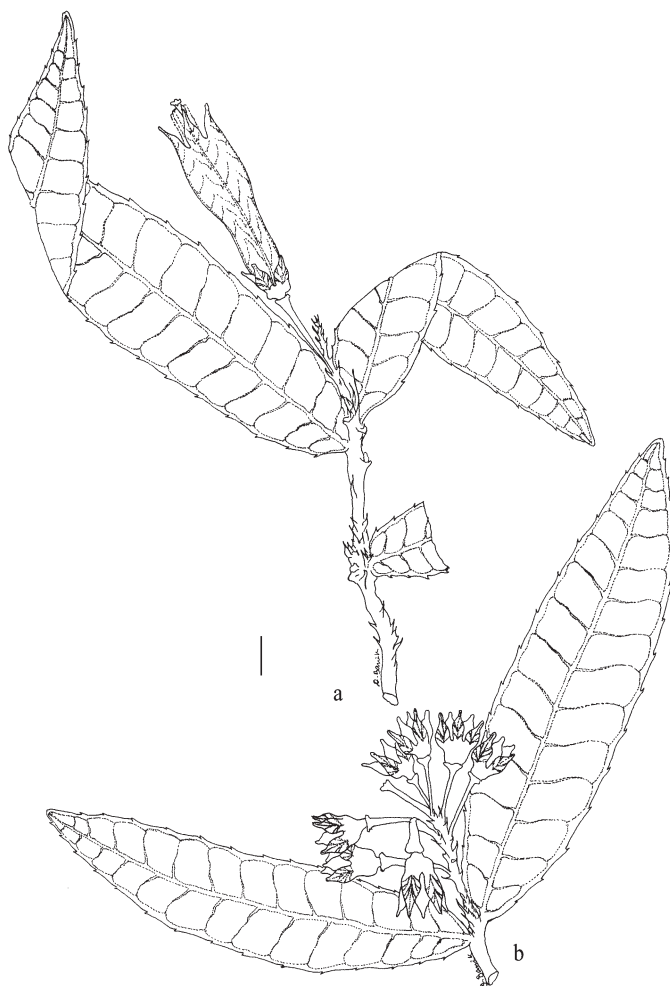


Fig. 4. *Agapetes megacarpa* W. W. Sm. a. Habit. b. Fruiting twig.
Scale bar = 1 cm (voucher: D. Prain's collector 941, CAL).

1.0–1.5 mm, pointed at base, seed coat reticulate.

Distribution: India (Nagaland: Jaboka), China (Yunnan) and Myanmar.

Flowering: February to April, September to October;

Fruiting: March to May.

Habitat: Epiphytic shrub in subtropical forests from 1300–2300 m altitude.

Notes: *Agapetes megacarpa* and *A. burmanica* were treated as two separate species by Airy Shaw (1948, 1959) and

Kress et al. (2003). *Agapetes burmanica* was distinguished from *A. megacarpa* in having 16–24 cm leaves and axillary inflorescence whereas in *A. megacarpa*, leaves are 10–18 cm long and inflorescence is pseudoterminal (Airy Shaw 1959). But the present study found both axillary and pseudoterminal inflorescences (M. A. Hock 769 and Prain's collector 941) and 12–16 cm long leaves in *A. megacarpa*. Therefore, *A. burmanica* is reduced as synonym under *A. megacarpa* after critical study of specimens of both the

species including types.

Agapetes megacarpa was previously recorded from China (Smith 1919, Airy Shaw 1959, Ruizheng and Stevens 2005) and *A. burmanica* was recorded from both China and Myanmar (Evans 1927, Airy Shaw 1935, 1948, 1959, Kress et al. 2003, Ruizheng and Stevens 2005).

The Nagaland population (Prains's collector 941) shows relatively shorter flower with calyx ca. 1 cm long and corolla 4.5–5.0 cm long.

Specimens examined: Nagaland; Naga Hill, Jabocka, 6000 ft., Feb. 1899, Prain's Collector (M. A. Hock) 769, fl. (CAL); Jabocka, 4000 ft., April 1899, Prain's Collector 941, fl. (CAL).

5. *Agapetes subsessilifolia* S. H. Huang, H. Sun & Z. K. Zhou in *Novon* **8**: 378, f. 1 (1998); F. Ruizheng & P. F. Stevens, *Fl. China* **14**: 511 (2005). **Type:** CHINA; Tibet, Medog, Hammni, 1600 m, Oct. 1992, S. Huang & al. 0997 (KUN–holo !). Tibet, Medog, Gelin, 1750 m, Dec. 1992, S. Huang & al. 2537, 2661 (KUN–para !); Buqiong lake, 1600 m, Nov. 1992, S. Huang & al. 1140 (KUN–para !). [Fig. 5]

Agapetes griffithii auct. non C. B. Clarke (1882): Argent & al. in *Notes. Roy. Bot. Gard. Edin.* **38**: 140, f. 2 (1980).

Epiphytic drooping shrub. Stems slender, terete, finely striate, glabrous, lenticellate, 5–15 mm in diameter; perulae 4–6, triangular to linear, 2–10 × 0.5–10.0 mm, acuminate at apex, accrescent, membranous, caducous. Leaves loosely spiral, 4–11 cm apart; petioles 2.0–6.0 × 3.5–5.0 mm, rugose, glabrous; lamina ovate-oblong to elliptic to broadly elliptic, 7.5–16.7 × 3.0–6.5 cm, obtuse to rounded at base, obscurely serrate at margin, acutely acuminate (acumen 1.5–2.0 cm long) at apex, coriaceous, bottle green above, light green beneath, veins obscurely raised above, brochidodromous, secondary veins 10–12 pairs at 60°–85°. Inflorescences axillary or cauline, corymbose, 2–9-flowered, glabrous,

filiform; peduncle 1.3–4.0 cm long, filiform, ca. 0.5 mm broad; bracts 2, triangular, 2.0–2.5 mm long, scaly, caducous. Flowers red; pedicels 0.6–3.0 cm long, filiform, ca. 1 mm broad (ca. 2 mm at apex), glabrous; pedicelar bract 1, triangular, ca. 1 mm long, scaly, caducous; bracteoles 2–3, closely alternate, obscure, similar to bract. Calyx 6.5–8.0 mm long, 3.0–3.5 mm in diameter, coriaceous, glabrous; lobes linear-elliptic, 3.5–5.5 × 1.5–4.0 mm, acuminate at apex, 2–3 pairs of secondary veins at 30°–60°, branched near margin. Corolla red, tubular-urceolate, 2.4–2.6 cm long, 5.5–10.0 mm in diameter, 5 angular, glabrous, reticulation dark violet, secondary veins 4–5 pairs, alternate to opposite at 60°–75°, directed downward, reticulation open; lobes green, ovate, 2.5–4.0 × ca. 2.5 mm, acuminate at apex. Stamens ca. 24 mm long; filaments spatulate, ca. 1 mm long, incurved, slightly puberulous; anthers ca. 22 mm long in total, thecae granular, 5–6 mm long, obscurely appendiculate at base, tubules ca. 16 mm long, glabrous. Pollen grains 3-zonocolporate, 36.25 (34–38) μm , endocolpium ca. 3 × 10 μm ; exine faintly granulate (LM); tetrads 50.6 (48–57) μm . Ovary ca. 3.0–3.5 mm in diameter; style linear, ca. 2.5 cm long, glabrous; stigma truncate. Fruits not known.

Distribution: India (Arunachal Pradesh: Lower Subansiri District) and China (Xizang).

Flowering: November to December.

Habitat: Common in subtropical forests at 1600–2100 m altitude.

Argent et al. (1980) described this species as *A. griffithii* but this species differs from *A. griffithii* in having coriaceous leaves with 2–6 × 3.5–5.0 mm petioles; ovate-oblong to elliptic or broadly elliptic lamina and filiform pedicel ca. 2 mm broad at apex.

Lower Subansiri population (S. S. R. Bennet & H. B. Naithani 3299) differs from the Chinese population in having obscurely serrate leaves and larger petioles 3.5–6.0 mm

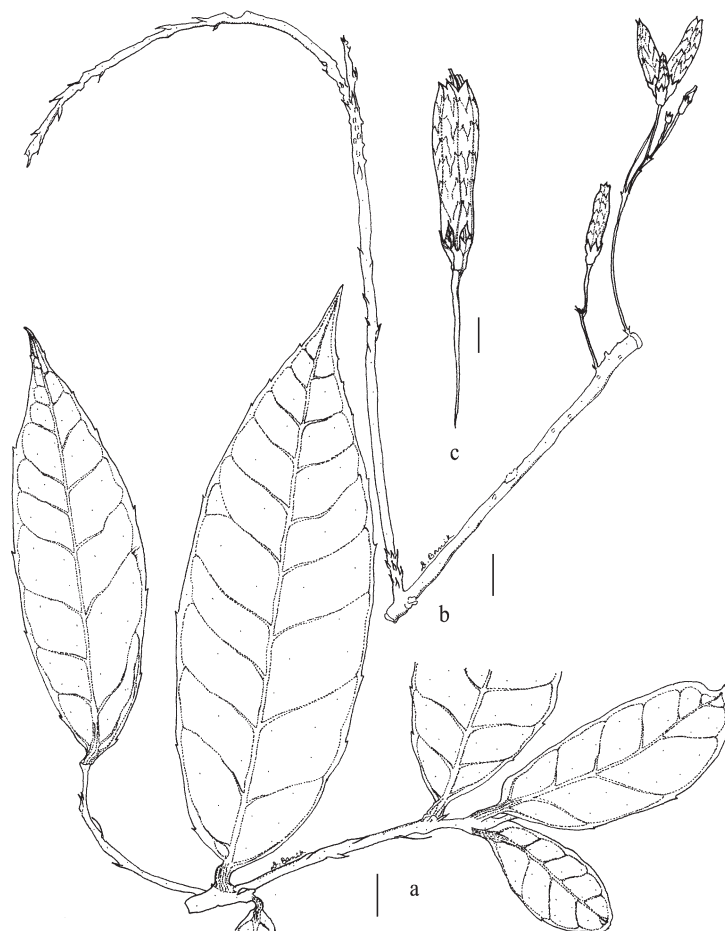


Fig. 5. *Agapetes subsessilifolia* S. H. Huang. a. Habit. b. Inflorescence from stem. c. Flower. Scale bars: a, b = 1 cm; c = 5 mm (voucher: S. S. R. Bennet & H. B. Naithani 3299, DD).

long.

Specimens examined: Arunachal Pradesh: Without precise locality, s. l. 184 (ARUN); Lower Subansiri District, Hapoli and Pange, ca. 2100 m, 1 Nov. 1977, S. S. R. Bennet & H. B. Naithani 3299 (DD).

6. ***Agapetes subvinacea*** Airy Shaw in Kew Bull. **13**: 500 (1959); W. J. Kress & al. in Contr. U. S. Natl. Herb. **45**: 214 (2003). **Type:** MYANMAR; 'Upper Burma', Nam Tamai valley 27°45'N, 97°57'E, 2400–2700 m, 19 Nov. 1937, F. Kingdon Ward 13482 (BM, web image !). [Fig. 6]

Epiphytic pendulous shrub. Lignotubers basal, amorphous, 6–7 mm in diameter. Stems slender, densely setose, brown, hairs 0.5–1.5 mm long. Leaves compactly spiral, 2–5 mm apart; petioles 0.5–1.0 mm long; lamina broadly ovate or suborbicular, rarely broadly elliptic, 8–14 × 6–12 mm, rounded at base, crenulated-denticulate or nearly entire or serrate at margin, obtuse or apiculate or mucronate at apex, coriaceous, upper rugose, veins depressed above, brochidodromous, 3–5 pairs of secondary laterals at 60°–90°. Flowers greenish-white, 1–3 in

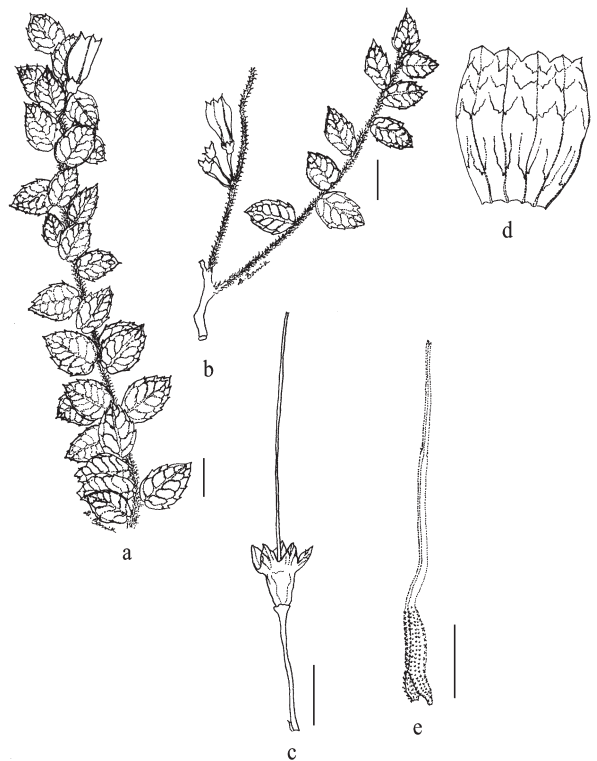


Fig. 6. *Agapetes subvinacea* Airy Shaw. a, b. Habit. c. Calyx and style. d. Corolla. e. Stamen. Scale bars: a, b = 1 cm; c, d = 5 mm; e = 3 mm (voucher: M. K. Pathak 3694, CAL).

fascicle or in corymbs, axillary, glabrous to glandular-setose; peduncle up to 4 mm long, sparsely glandular-setose, bracts subulate, glandular-setose or glabrous, caducous. Pedicels 8–16 mm long, sparsely glandular setose or glabrous; pedicelar bract 1, bracteoles 2, opposite, broadly ovate, ca. 1.0×0.5 mm, acuminate at apex, caducous. Calyx ca. 5.5 mm long, 2.0–4.5 mm in diameter, glabrous or sparsely glandular hairy; lobes ovate, $2-3 \times 1.5-1.7$ mm, acute or acuminate at apex. Corolla greenish white, tubular, 1.5–1.7 cm long, 0.5–1.0 cm in diameter, obscurely 5-angular, glabrous, reticulate with 4–5 pairs of laterals at $15^\circ-85^\circ$; lobes triangular, $1-2 \times 1-2$ mm. Stamens (7–)14–16 mm long; filaments ovate, ca. 1×1 mm, puberulous outside;

anthers 6 or 14–15 mm long in total, thecae granular, ca. 4.5 mm long, appendiculate 0.2–1.0 mm long and 1–2-lobed at base, slightly spreading, projected downward, tubules (4–)9–10 mm long, open by apical slits. Ovary ca. 4.5 mm in diameter; styles 7 or 16 mm long, glabrous; stigma truncate. Berries globose, 4–5 mm in diameter, obscurely 5-angular, puberulous.

Distribution: India (Arunachal Pradesh: Dibang Valley District) and Myanmar.

Flowering: October to November.

Fruiting: November.

Habitat: Common in subtropical forests at 1680–2700 m altitude.

Notes: Description of this species in the protologue was based on flower bud. Therefore the measurements of different

parts of open flowers are added from Dibang Valley population. Dibang Valley population shows relatively larger pedicels 1.0–1.6 cm long and longer corolla 1.5–1.7 cm.

Specimens examined: Arunachal Pradesh; Dibang valley district, Damen to Chaipani River, 1680 m, 4 April 2001, M. K. Pathak 3694, fl. (CAL).

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- D. バニク^a*, M. サンジャツパ^b: インド新産のツツジ科 *Agapetes* 属植物
- ツツジ科 *Agapetes* 属植物はヒマラヤ・中国・東南アジア・西太平洋諸島に約95種が知られており、インドにはこれまで約34種が記録されてきた (Santapau and Henry 1973). 2000年から2004年にかけて東ヒマラヤとインド北東部を調べた結果、約58種と15変種がインドに分布することが明らかになっている。ここに新たに6種を加え、新産種について記載と図を發表した。
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